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Understanding the Impact of the Digital Millennium Copyright Act on the Open Source Model of Software Development

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UNDERSTANDING THE IMPACT OF THE DIGITAL MILLENNIUM COPYRIGHT ACT ON THE OPEN SOURCE MODEL OF SOFTWARE DEVELOPMENT

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I. INTRODUCTION

Imagine that your child is blind[1] and you would like them to be able to listen to an electronic book (eBook).[2] Or imagine that you own a computer with an operating system that does not quite support a particular piece of software that you really want to use.[3] Your first thought might be that you may be able to find a company or person providing products or services to meet these needs. Your second thought, if you have an entrepreneurial spirit, might be that you should start a company to fill such needs. If you follow through on either one of these ideas, you may be unwise. Under the Digital Millennium

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1. *See* Lawrence Lessig, *Jail Time in the Digital Age*, N.Y. TIMES, July 30, 2001, at A21. *But see* Robert Holleyman, *Letter to Editor*, BUS. SOFTWARE ALLIANCE, *at* http://www.bsa.org/resources/admin/2001-08-14.60.pdf (last visited Aug. 14, 2001) (response to Lessig's article).

2. An eBook is a digitized copy of a book whereby the text of a book is downloaded onto a computer via the Internet. The text is then read through a commercially available eBook reader. In contrast to a traditional paper book, however, the publishers of an eBook can attach any number of security features. For example, they can restrict the user's ability to copy, loan, print, or utilize a text to speech conversion of the eBook. These security features are implemented through various software plug-ins which are attached to the eBook reader. *See U.S. v. Sklyarov: Frequently Asked Questions (and Answers) About the Dmitry Sklyarov Prosecution*, *at* http://www.eff.org/IP/DMCA/US_v_Sklyarov/us_v_sklyarov_faq.html (last modified Aug. 6, 2001). *See, e.g.*, Adobe Acrobat eBook Reader 2.2, *at* http://www.adobe.com/products/eBookreader/overview1.html (last visited Aug. 28, 2001).

3. *See* Amy Harmon, *New Economy: New Visibility for 1998 Copyright Protection Law, With Online Enthusiast Confused and Frustrated*, N.Y. TIMES, Aug. 13, 2001, at C4.

Copyright Act[4] (DMCA), persons or companies providing such products or services may be subject to civil and criminal liability.[5]

This Article argues that the DMCA supports the "Traditional Model"[6] of software development, at the expense of the "Open Source Model,"[7] by limiting the ability of open source developers to write programs that increase interoperability[8] and by limiting their ability to engage in peer review for such programs. As a way to begin to understand the impact of the DMCA, Part II of this Article provides an overview of the Traditional and Open Source Models of software development. Next, Part III examines the statutory history and language of the DMCA and highlights two competing interpretations of the 17 U.S.C. § 1201(f) safe harbor provision (the "Reverse Engineering Safe Harbor"). In Part IV, two relevant cases, *Universal City Studios, Inc. v. Reimerdes*[9] and *United States v. Elcom Ltd.*,[10] are discussed to illustrate the lack of protection afforded to software developers seeking to increase the interoperability of programs utilizing copyrighted

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4. 17 U.S.C. § 1201 (2001) (enacted as the Digital Millennium Copyright Act of 1998). *See* 144 CONG. REC. S11,887 (1998) (statement of Sen. Herb Kohl).

5. Both declaratory and injunctive relief is available for civil violations of the DMCA. *See* 28 U.S.C. §§ 2201(a), 2202 (1994 & Supp. V 1999). A criminal violation occurs when one "willfully" violates the DMCA. *See* 17 U.S.C. § 1204 (2000).

6. *See* Patrick K. Bobko, *Open-Source Software and the Demise of Copyright*, 27 RUTGERS COMPUTER & TECH. L.J. 51, 60-61 (2001). *See also* Shawn W. Potter, *Opening Up to Open Source*, 6 RICH. J.L. & TECH. 24, ¶ 3 (2000) (referring to this model as the "Proprietary" model).

7. *See* Marcus Maher, *Open Source Software: The Success of an Alternative Intellectual Property Incentive Paradigm*, 10 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 619, 621 (2000). *See generally* Richard Stallman, *The GNU Manifesto*, *at* http://www.gnu.org/gnu/manifesto.html (last visited Aug. 16, 2001) (describing the philosophical underpinning of the open source code movement beyond mere economic issues); *History of the OSI*, *at* http://www.opensource.org/docs/history.html (last visited Aug. 16, 2001) (providing a history of the open source movement through July of 1999). *See also* GLYN MOODY, REBEL CODE, THE INSIDE STORY OF LINUX AND THE OPEN SOURCE REVOLUTION (2001) (tracing the history of the development of the Linux Operating System and other open source projects).

8. *See* 17 U.S.C. § 1201(f)(4) ("[t]he term 'interoperability' means the ability of computer programs to exchange information, and of such programs mutually to use the information which has been exchanged"). *See generally* David Nimmer, *A Riff on Fair Use in the Digital Millennium Copyright Act*, 148 U. PA. L. REV. 673, 736-737 (2000) (arguing that § 1201(f)(1) prevents consumers from purchasing software or services which increase the interoperability between programs utilizing protected data, while at the same time allowing them to design and implement their own software to achieve the same end).

9. Universal City Studios, Inc. v. Reimerdes, 111 F. Supp 2d. 294, 55 U.S.P.Q.2d (BNA) 1873 (S.D.N.Y. 2000).

10. Indictment, United States v. Elcom Ltd., No. CR-01-20138 (N.D. Cal. Aug. 28, 2001).

materials. Part V of this Article implicates the Reverse Engineering Safe Harbor as the cause of this lack of protection and applies the two competing interpretations of this provision to understand the impact the lack of protection has on the Open Source Model. Finally, Part VI proposes ways to implement a statutory solution to address the lack of protection.

II. AN OVERVIEW OF THE TRADITIONAL AND OPEN SOURCE MODELS OF SOFTWARE DEVELOPMENT

Labor is one of the chief, if not the chief, costs associated with software development. Different than other industries, for example the steel industry, which involves the purchase and maintenance of machinery associated with production, the primary cost in producing software is the cost of paying the software developers.[11] The Traditional and Open Source Models of software development differ in how they address this cost.

A. The Traditional Model

The Traditional Model of software development functions under the premise that labor costs should be paid by the profits earned from selling software. This model has been described as follows:

> The [T]raditional [M]odel of software development is based upon two premises: 1) developer time is paid for by selling the software; and 2) the price software will fetch at market is proportional to its value as an economic tool. Microsoft is the most famous practitioner of this method of software development....[12]

Under the Traditional Model, the sale of software generates revenue.[13] Companies such as Microsoft, which use the Traditional

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11. *See generally* Bobko, *supra* note 6; John Gittelsohn, *India Abounds in Low-Cost, English-Fluent, Highly Skilled Tech Workers at Time of U.S. Shortage*, KNIGHT-RIDDER/TRIBUNE NEWS SERVICE, June 15, 2000, at K254 ("Beginning computer programmers [can] earn $600 to $1,000 a month in India, compared with $4,000 to $5,000 in the United States...."); Julia King, *Exporting Jobs Saves IT Money; U.S. Firms Buy in to Innovative Approach to Labor, Visa Crunch*, COMPUTERWORLD, Mar. 15, 1999, at 24 ("[s]oftware teams with a ratio of 25 on-site workers to 75 workers offshore in India can expect to pay a blended hourly rate of about $37, compared with an average rate of $75 to $100 for an all-U.S. team....").

12. Bobko, *supra* note 6.

13. *Few Bright Spots, Apart from the Home PC*, BusinessWeek, January 14, 2002, at 94 (discussing projected Microsoft profits from the sale of the Windows XP operating system); *Software*, BusinessWeek, January 10, 2000, at 94 (discussing projected profits from the sale of

Model, seek to protect their property rights in this software.[14] They effectuate this protection by licensing rather than selling their software,[15] and by only providing the software user with the object code,[16] and not the source code.[17] The user cannot readily modify the object code, while the user can modify the source code.[18]

B. The Open Source Model

In contrast to the Traditional Model, those developers employing the Open Source Model of software development cover labor costs by selling services to maintain and support the software they produce.[19] The software itself is typically free.[20] The philosophy behind paying for labor costs through the sale of services and support is reflected in the comments of one of the chief proponents of the Open Source Model, Eric Raymond.[21] Mr. Raymond states:

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the Windows 2000 operating system).

14. It is important to point out that non-software companies such as Universal Studios, Walt Disney, and others embrace the Traditional Model with respect to products in the form of DVDs. *See Reimerdes*, 111 F. Supp 2d at 308–10; 55 U.S.P.Q.2d (BNA) at 1879–81.

15. *See* Bobko, *supra* note 6, at 62. *See generally* Stephen T. Keohane, *Mass Market Licensing*, 652 PLI/Pat 437, 444 (2001) (describing the various types of software licensing schemes); Holly K. Towle, *Advanced Licensing for the New Economy*, 644 PLI/Pat 245, 249 (2001) (discussing the impact of the Uniform Computer Information Transaction Act on software licensing).

16. Object code is "machine code [that is "0"s and "1"s] generated by a source code language processor such as an assembler or compiler. A file of object code may be immediately executable or it may require linking with other object code files, e.g., libraries, to produce a complete executable program." *Free Online Dictionary of Computing, at* http://foldoc.doc.ic.ac.uk/foldoc/foldoc.cgi?object+code (last visited Aug. 29, 2001). *See generally Reimerdes*, 111 F. Supp 2d. at 306, 55 U.S.P.Q.2d (BNA) at 307 (describing object code); Potter, *supra* note 6 ("Proprietary software vendors generally sell only the compiled form.").

17. Source code is the code "written in some formal computer language which can be compiled automatically into object code . . . ." *See Free Online Dictionary of Computing, at* http://foldoc.doc.ic.ac.uk/foldoc/foldoc.cgi?query=source+code&action=Search (visited Aug. 29, 2001). *See Reimerdes*, 111 F. Supp 2d. at 306, 55 U.S.P.Q. (BNA) at 306 (describing source code).

18. *See* Potter, *supra* note 6.

19. *See* Bobko, *supra* note 6, at 86-86. *See generally* Bill Alpert, *Cashing In on Linux: A Firm Hopes to Match Red Hat's Success*, BARRON'S, Dec. 6, 1999, at 53 (discussing the creation of revenue through the sale of services to support the open source Linux operating system). *Freeware*, THE ECONOMIST, Aug. 22, 1992, at 56 (covering Richard Stallman's early involvement with a service based model of software development).

20. *See* Joseph Alper, *From Army of Hackers, an Up-Start Operating System*, SCIENCE, Dec. 11, 1998, at 1976. *See also* Alpert, *supra* note 19 (describing the costs of the various service packages associated with the open source Linux operating system).

21. Raymond is widely credited for convincing Netscape to release the source code for its Internet browser. *See* Daniel Dern, *Open Sesame: Author Eric Raymond Avidly Preaches*

> Anybody who has studied software engineering knows that programmers do not actually spend most of their time originating software. They spend most of their time on service updates and maintenance. Nobody thinks about the implications of this: that the software industry is actually a service industry operating under the delusion that it is a manufacturing industry.[22]

The use of service as the basis for generating revenue can only be fully utilized where the user is provided with both the object code and the source code.[23] The availability of source code allows the user, and the software developers that the user may employ, the greatest flexibility to modify the code as needed. This flexibility enables the developer to realize the largest amount of revenue by providing services to meet these needs.

C. The Open Source Development Process

1. Meeting User's Needs as the Goal

Poorly written software should not be supported and software is only poorly written to the extent that it fails to do what it is supposed to do—meet the user's needs. While in one sense both the Traditional Model and the Open Source Model embrace this idea, the Open Source Model takes the idea to a higher level of application. Under the Traditional Model, poorly written software is fixed over a long period of time, through the release of various upgraded versions of the software.[24] However, due to the availability of the source code, the Open Source Model not only makes it possible to fix the software generally, by fixing

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the Benefits of Giving Away Source Code, COMPUTERWORLD, (July 13, 1998), *available at* http://www.computerworld.com/cwi/Printer_Friendly_V.. ./0,1212,NAV47_STO31758,00.htm. *See generally*, *Netscape Breaks Free*, THE ECONOMIST, Mar. 28, 1998, at 60 (describing Netscape's decision to make the source code available for their internet browser).

22. Andrew Leonard, *Let My Software Go: Netscape was Desperate for a New Strategy Against Microsoft. Eric Raymond Hacker Guru Had One*, Salon.com, *at* http://www.salon.com/21st/feature/1998/04/cov_14feature.html (Apr. 1998); *See generally* ERIC RAYMOND, THE CATHEDRAL & THE BAZAAR: MUSINGS ON LINUX AND OPEN SOURCE BY AN ACCIDENTAL REVOLUTIONARY 118-119 (2001) (describing the importance of software maintenance).

23. *See* Dern, *supra* note 21.

24. The prime example of this is Microsoft's Windows Operating System. *See* Yardena Arar, *Windows XP to Ship October 25*, PCWorld.com, (May 9, 2001) *available at* http://www.pcworld.com/news/article/0,aid,49606,00.asp; Doug Bedell, *Windows Me Offers Incremental Upgrade*, KNIGHT-RIDDER/TRIBUNE NEWS SERVICE, Sept. 7, 2000, at K5963; Reid Goldsborough, *Should You Upgrade Your Operating System*, POPTRONICS, Sept. 2001, at 21.

problems encountered by all users, but, more importantly, makes it possible to fix the software as it pertains to the individual user.[25] As one commentator noted:

> Why does open-source matter to you? While you may not have any desire to mess around with source code, there are many reasons why open-source can be an advantage for users. Developers can write quick patches that solve little problems. Companies can extend the functionality of their applications to meet specific objectives.[26]

Thus, the Open Source Model casts the concept of what constitutes poorly written software more broadly than the Traditional Model. Specifically, software that fails to meet an individual user's needs is poorly written, and collectively, developers' goal should be to fix such software.

2. Interoperability

If meeting an individual user's needs is the goal of the Open Source Model, then interoperability[27] is the "bread and butter."[28] Interoperability is the ability of software and hardware on multiple machines from multiple vendors to communicate.[29] Richard Stallman was one of the founders of the Open Source Model and one of the first to cite the benefits of having open source code available as it related to the issue of interoperability.[30] Stallman cites the example of being able to tailor the software used in an office copier such that it would alert the person printing a document from a computer that his or her document has been printed.[31] This eliminates the need for the person having to

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25. This in a sense is related to the issue of the "scalability" of a particular piece of software, that is, the ability of the software to work when the size of the problem it is designed to address increases. *See* RAYMOND, *supra* note 22, at 143. *See generally* Free Online Dictionary of Computing, *supra* note 17 (defining scalability as: "How well a solution to some problem will work when the size of the problem increases").

26. Larry Seltzer, *Software Returns To Its Source*, PC MAGAZINE, Mar. 23, 1999, at 166.

27. "[T]he term 'interoperatability' means the ability of computer programs to exchange information, and of such programs mutually to use the information which has been exchanged." 17 U.S.C. § 1201(f)(4) (2000).

28. Chris Taylor, *Throwing the E-Book at Him: A Programmer is Prosecuted for Enabling Users to Break the Security in Reader Software*, TIME, Aug. 20, 2001, at 62.

29. *See* Free Online Dictionary of Computing, *supra* note 17.

30. *See* Simson L. Garfinkel, *Programs to the People: Computer Whiz Richard Stallman is Determined to Make Software Free—Even if He Has to Transform the Industry Single-Handed*, TECH. REV., Feb.-Mar. 1991, at 52.

31. *Id.*

wait at the copier until the document is actually printed. The ability to tailor the copier software is no longer possible however, when a new office copier is introduced with source code that is not open.[32]

3. Peer Review

Under the Open Source Model, peer review guarantees the quality of the software produced. Peer review functions under the maxim that "[g]iven enough eyeballs, all bugs are shallow."[33] That is, the more software developers that check a piece of code for bugs, the greater the reliability of the code.[34] As Raymond states: "The central problem in software engineering has always been reliability. Our reliability, in general sucks. In other branches of engineering, what do you do to get high reliability? The answer is massive, independent peer review."[35] It is peer review that guarantees the quality of the software and its ability to meet a user's interoperability needs. The importance of peer review is expressed in the various open source-licensing schemes.[36]

D. Licensing

There are a number of different types of licenses utilized by the Open Source Model.[37] The most common is the General Public License (GPL).[38] The GPL restricts distribution by requiring derivative products of open source software to be distributed with the source code.[39] Put another way, any software that uses GPL software as a part of its end product must make the source code available, regardless of whether a

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32. The concept of interoperability is further reflected in Raymond's maxim that "[g]ood programmers know what to write. Great ones know what to rewrite (and reuse)." RAYMOND, *supra* note 21, at 24. The point of this maxim is that great programmers are those who know how to rewrite code to meet user needs. *See id.*

33. RAYMOND, *supra* note 22, at 30.

34. A bug is an unwanted and unintended property of a program that causes it to malfunction. *See* Free Online Dictionary of Computing, *at* http://foldoc.doc.ic.ac.uk/foldoc/foldoc.cgi?query=bug (last visited Aug. 29, 2001).

35. *See* Leonard, *supra* note 22. *See also* Maher, *supra* note 7, at 626-27 (describing how the internet works to increase peer review through "project web pages, mailing lists [and] news groups").

36. *See* Maher, *supra* note 7, at 638-40.

37. *See id.*

38. *See* RAYMOND, *supra* note 22, at 69. *See also Frequently Asked Questions about the GNU GPL*, *at* http://www.gnu.org/copyleft/gpl-faq.html (last visited Aug. 30, 2001) (addressing many of the common questions regarding the GPL license).

39. *See* Potter, *supra* note 6. *See generally GNU General Public License Version 2*, *at* http://www.gnu.org/copyleft/gpl.html (last visited Aug. 30, 2001) (noting that section 3 covers the requirement that one furnish the source code for derivative works).

company using the Traditional Model designs it. In contrast, software licensed under the Traditional Model typically only contains some type of use restrictions.[40] The GPL ensures that the source code will be available for peer review. The use restrictions imposed by the GPL have lead companies employing the Traditional Model to label the Open Source Model as "an intellectual property destroyer"[41] and as a form of "theft."[42] Furthermore, companies such as Microsoft have started to implement a new licensing scheme that prohibits the use of open source software.[43]

E. Open Source Products: Linux

One of the most popular open source products is the Linux operating system (Linux).[44] Initially developed by Linus Torvalds,[45] Linux has been called the "main thrust" of the Open Source Model.[46] In

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40. *See id. See generally* Bob Kane, *Licensing Agreements*, PC MAGAZINE, Nov. 1999, at 103 (contrasting the "typical" software license with the open source GPL).

41. *See Microsoft Executive Says Linux and Its Kind Threaten Innovation,* CnetNews.com, *at* http://news.cnet.com/investors/news/newsitem/0-9900-1028-4825241-RHAT.html?tag=nisi (Feb. 14, 2001). *See also* Mike Ricciuti, *Gates Wades into Open-Source Debate*, CnetNews.com, *at* http://news.cnet.com/news/0-1003-202-6322264.html (June 19, 2001) (citing Bill Gates' concern for the "Pac-Man-like nature" of the open source licensing scheme).

42. *See* Ben Charney, *Microsoft Raps Open-Source Approach*, CnetNews.com, *at* http://news.cnet.com/news/0-1003-200-5813446.html (May 3, 2001). *But see* Craig Mundie, *The Commercial Software Model & Sustainable Innovation*, *at* http://www.microsoft.com/BUSINESS/licensing/ssmundie.asp (last visited Aug. 22, 2001) (Microsoft executive Craig Mundie recanting some of his earlier statements).

43. *See* Stephen Shankland, *Microsoft License Spurns Open Source*, CnetNews.com, *at* http://news.cnet.com/news/0-1003-202-6352301.html (June 22, 2001). *See also* Scott Rosenberg, *Microsoft's Halloween Scare*, Salon.com, *at* http://www.salon.com/21st/rose/1998/11/04staight.html (Nov. 4, 1998) (referring to Microsoft's strategy in dealing with the Open Source Model as "target[ing] a process rather than a company"). Clearly, Microsoft's new licensing scheme furthers this strategy.

44. *See* Maher, *supra* note 7, at 619. *See generally* RAYMOND, *supra* note 22, at 141 ("In early 1999 IDC [International Data Corporation] projected that Linux would grow faster than all other operating systems combined through 2003; this projection has held true so far."); Steven Brody, *IDC Says Linux Likely to Lead OS Growth*, LinuxWorld.com, *at* http://www.linuxworld.com/linuxworld/lw-1999-03/lw-03-idc_p.html (Mar. 31, 1999) (citing a projected 25% compound growth rate for Linux through 2003); Seltzer, *supra* note 26, at 176 (citing 1998 figures showing that the Linux operating system controlled 17% of the server market).

45. *See* RAYMOND, *supra* note 22, at 15-16. *See generally* Maher, *supra* note 7, at 622 (giving an overview of Linux, its beginnings as the Linux kernel, and its relationship to GNU Project started by Richard Stallman).

46. *See* RAYMOND, *supra* note 22, at 177.

particular, open source proponents such as Eric Raymond have stated that:

> [p]romoting Linux must be our main thrust. Yes, there are other things going on in the open-source world, and the campaign will bow respectfully in their direction—but Linux started with the best name recognition, the broadest software base, and the largest developer community. If Linux can't consolidate the break-through, nothing else will, pragmatically speaking, have a prayer.[47]

The popularity and success of Linux is reflected in comments by Linux's competitors,[48] investor's reaction to Linux,[49] and companies providing services to support Linux.[50] Microsoft executives have been quoted as saying: "Linux and other open source software (OSS) advocates are making a progressively more credible argument that OSS is at least as robust—if not more—than commercial alternatives."[51] They have also claimed: "Linux represents a best-of-breed UNIX, that is trusted in mission critical applications, and due to its open source code has a long term credibility which exceeds many other competitive OSS."[52] Well-established companies such as IBM have heavily invested in Linux.[53] Additionally, despite the failure of many "dot-com"

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47. *Id.*

48. *See* Eric Raymond, *Halloween Documents*, *at* http://www.winnetou.lcd.lu/halloween1.html (last visited Aug. 16, 2001) [hereinafter *Halloween Documents*]. *See generally* Bob Trott, *Microsoft Pondering Legal Challenge to Linux*, cnn.com, (Nov. 6, 1998) *available at* http://www.cnn.com/TECH/computing/9811/06/linux.threat.idg. (describing the Halloween Documents, a group of documents leaked from Microsoft employees to Eric Raymond, evaluating the threat posed by Linux); Mary Jo Foley, *Microsoft Evaluates the Open Software 'Threat'*, (Nov. 2, 1998) *available at* http://www.zdnet.com/eWeek (describing the Halloween Documents); Rosenberg, *supra* note 43 (discussing the Halloween Documents as they relate to Microsoft's overall strategy in dealing with the Open Source Model).

49. *See* Dan Gillmor, *Big Blue Places $1 Billion Bet on Linux*, KNIGHT-RIDDER/TRIBUNE NEWS SERVICES, Aug. 22, 2001, at PK7703; Mark Hall, *Linux: Ready For Prime Time?*, COMPUTERWORLD, Nov. 13, 2000, at 108.

50. *See* Ed Scannell, *Linux Takes the Operating System Scene by Storm*, INFOWORLD, Jan. 17, 2000, at 60. *See also VA Linux IPO Soars Almost 700 Percent*, INFOWORLD, Dec. 13, 1999, at 3 (describing the IPO of VA Linux, a hardware manufacturer, which configures computers to run Linux).

51. *Halloween Documents*, *supra* note 48.

52. Eric Raymond, *Halloween Documents*, *at* http://www.opensource.org/halloween/halloween2.html (last visited Aug. 16, 2001).

53. *See* Gillmor, *supra* note 49; Hall, *supra* note 49. *See generally*, REUTERS, *Sun Micro to Roll Out New Low-End Linux Servers*, (Feb. 7, 2002) (on file with the MARQUETTE INTELLECTUAL PROPERTY LAW REVIEW) (Sun Microsystems offering Linux-based servers in lieu of Sun's own server operating system); IBM, *Tommy Hilfiger Chooses IBM and Linux for e-Business Infrastructure* (December 6, 2002), *available at*

companies, companies supporting Linux have been able to survive, if not thrive.[54]

Raymond and other proponents of Linux and the Open Source Model have argued that in order for Linux and the Open Source Model to succeed, supporters must try to convince Fortune 500 companies of the benefits of the Open Source Model.[55] Furthermore Linux supporters have been urged to "co-opt"[56] the media who shape the opinions of the Fortune 500 companies and to engage in "guerrilla" marketing tactics.[57] Conspicuously absent from this list is the requirement that supporters be involved in the political process, by for example, lobbying Congress.[58] With this background, one can begin to understand the impact the DMCA has on the Open Source Model.

III. THE HISTORY AND WORDING OF THE DMCA

Generally speaking, the DMCA is a "paracopyright"[59] law which among other things,[60] prohibits the design of, or trafficking in, devices or services with the purpose of circumventing copyright protections.[61] It provides for both civil[62] and criminal liability.[63] The legislative intent

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wysiwyg://29/http:?www.linuxjournal.com/article.php?sid+5654 (citing costs saving in using Linux as one of the reasons for their decisions to go with Linux); Scott Hillis, *Amazon Says Saving Money with Sift to Linux*, Reuters (October 30, 2001) (on file with the MARQUETTE INTELLECTUAL PROPERTY LAW REVIEW) (attributing a 25% cost savings over the previous year's technology costs to Amazon's switch to Linux).

54. *See* Mark Borden, *Wall Street Doesn't Get the Cult of Linux*, FORTUNE, July 24, 2000, at 44.

55. *See* Seltzer, *supra* note 26, at 178.

56. *Id.*

57. *Id.*

58. *See infra* Part VI.B.

59. *See* Nimmer, *supra* note 8, at 686. *See also* Lydia Pallas Loren, *Digitization, Commodification, Criminalization: The Evolution of Criminal Copyright Infringement and the Importance of the Willfulness Requirement*, 77 WASH. U. L.Q. 835, 838 n.12 (1999) (referring to the DMCA, stating: "This paracopyright grants to the owner of a copyrighted work an additional right to control access to their work through technological protections and to have legal protection against the circumvention of those technological protections."). *See generally* 144 CONG. REC. H7094 (1998) (Statements of Rep. Bliley: "In fact, the 'anti-circumvention' provisions of the Administration's bill created entirely new rights for content providers that are wholly divorced from copyright law.").

60. The DMCA also added a new section to Title 17 protecting vessel hull designs. *See* 17 U.S.C. § 1301(a) (2000).

61. *See* 17 U.S.C. §§ 1201(a)(1)(A), (a)(2), (b) (2000).

62. *See* 28 U.S.C. § 2201(a) (1994 & Supp. V 1999) (declaratory relief); 28 U.S.C. § 2202 (1994 & Supp. V 1999) (injunctive relief).

63. *See generally* 17 U.S.C. §§ 1204(a)(1) - (2) (2000). The provision states:

IN GENERAL.-Any person who violates section 1201 or 1202 willfully and for

underlying the DMCA was to "encourage the creation of new works."[64] The DMCA was designed to protect content producers, such as publishing, music and recording, film and video, and computer software companies.[65] Specifically, the DMCA was passed to meet a perceived[66] need of content producers that, absent stronger copyright protections, there would be little incentive to implement new technologies.[67] The DMCA was cited by some members of Congress as the most important piece of legislation passed during the 104th Session of Congress.[68] Much of this importance can be attributed to the economic value of the industries protected by the DMCA.[69]

A. A Breakdown of the DMCA

The DMCA contains three anti-circumvention provisions, and a number of safe harbor provisions,[70] including one dealing with

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purposes of commercial advantage or private financial gain-
shall be fined not more than $500,000 or imprisoned for not more than 5 years, or both, for the first offense; and
shall be fined not more than $1,000,000 or imprisoned for not more than 10 years, or both, for any subsequent offense.
LIMITATION FOR NONPROFIT LIBRARY, ARCHIVES, EDUCATIONAL INSTITUTION, OR PUBLIC BROADCAST ENTITY.-Subsection (a) shall not apply to a nonprofit library, archives, educational institution, or public broadcasting entity (as defined under section 118(g).
STATUTE OF LIMITATIONS.-No criminal proceeding shall be brought under this section unless such proceeding is commenced within 5 years after the cause of action arose.

64. 144 CONG. REC. S11889 (1998) (Statements of Sen. Hatch).

65. *See* 144 CONG. REC. H7098 (1998) (Statements of Rep. Foley).

66. *See* Nimmer, *supra* note 8. *See also* L. Ray Patterson, *Understanding the Copyright Clause*, 47 J. COPYRIGHT SOC'Y U.S.A. 365, 387 (2000) (arguing that from a historical perspective the DMCA upsets the balance between the property rights of the copyright holders and the free exchange of ideas); Lawrence Lessig, *Open Code and Open Societies: Value of Internet Governance*, 74 CHI.-KENT L. REV. 1405, 1419-1420 (1999) (arguing that there must be a balance between the proprietary world and the open source world on the Internet); Lawrence Lessig, *The Law of the Horse: What Cyberlaw Might Teach*, 113 HARV. L. REV. 501, 525 (1999) (arguing that the DMCA displaces the balance between fair use on the one hand and intellectual property rights on the other).

67. *See* 144 CONG. REC. S11891 (Statements of Sen. Leahy).

68. *See* 144 CONG. REC. S12376 (Statements of Sen. Hatch).

69. *See* 144 CONG. REC. S4884 (Statements of Sen. Hatch). *See also* 144 CONG. REC. H7098 (1998) (Statements of Rep. Foley: "These creative industries contribute nearly $280 billion to the gross domestic product yearly and provide jobs for some 3.5 million Americans. Moreover, they are our biggest export earners, accounting for some $60 billion in foreign sales.").

70. *See generally* 17 U.S.C. § 1201(e) (2000) (creating a safe harbor for the intelligence activities of state and federal law enforcement); 17 U.S.C. § 1201(e) (protecting, among other

interoperability.[71] To understand the DMCA, it is important to keep in mind the distinction between those who actually create a device designed to circumvent copyright protection, and those who traffic in such devices.[72] The DMCA makes this distinction and applies sanctions accordingly.

1. The Basic Provision: § 1201(a)(1)(A)

The first anti-circumvention provision is known as the "Basic Provision."[73] It applies to all persons who circumvent technological measures designed to protect copyrighted materials.[74] When first enacted, the Basic Provision carried a two-year enforcement moratorium.[75] The purpose of this moratorium was to allow the United States Copyright Office and the Librarian of Congress to determine whether the anti-circumvention provisions of the DMCA had adversely affected the ability of persons to make non-infringing uses of the various materials protected under the DMCA.[76] At the end of this two-year period, two further exceptions to the DMCA were recommended.[77]

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things, those persons pursuing good faith encryption research); 17 U.S.C. § 1201(j) (allowing circumvention when the security of an encryption device is being tested).

71. *See* 17 U.S.C. § 1201(f).

72. *See, e.g.*, Universal City Studios, Inc. v. Reimerdes, 111 F. Supp 2d. 294, 320, 55 U.S.P.Q.2d (BNA) 1873, 1887-88 (S.D.N.Y. 2000) (reasoning that the defendant circumventors would be in a stronger position had they themselves authored the circumventing device).

73. *See* Nimmer, *supra* note 8, at 684.

74. *See generally* 17 U.S.C. § 1201(a). This section states:

> Violations Regarding Circumvention of Technological Measures.—
>
> (1)(A) No person shall circumvent a technological measure that effectively controls access to a work protected under this title. The prohibition contained in the preceding sentence shall take effect at the end of the 2-year period beginning on the date of the enactment of this chapter [17 U.S.C.A. § 1201 et seq.].

75. *Id.*

76. *See* 17 U.S.C. § 1201(a)(1)(B) to (C). *See also* Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies, 65 Fed. Reg. 64556, 64564-74 (2000) (discussing the testimony and resulting criticisms leveled against the DMCA). *See generally* Robin D. Gross, *EFF DMCA Anti-Circumvention Comments, at* http://www.eff.org/Intellectual_property/DMCA/19990809_eff_comments.html (Aug. 9, 1999) (letter from Robin D. Gross, Staff Attorney, The Electronic Frontier Foundation, to the National Telecommunications and Information Administration and U.S. the Copyright Office); *DMCA Comments of the Software & Information Industry Association, at* http://www.eff.org/Intellectual_property/DMCA/19990726_SIIA_comments.html (July 26, 1999) (letter from Software & Information Industry Association to U.S. Copyright Office).

77. *See generally* 65 Fed. Reg. 64562-63. The Final Rule promulgated by the Copyright Office and the Library of Congress found that two exceptions existed for two classes of works:

2. The Ban on Trafficking: § 1201(a)(2)

The second provision, known as the "Ban on Trafficking,"[78] applies to those who sell or traffic in devices or services designed to circumvent copyright protections.[79] For a person to be liable under this provision, the device or service must have little or no commercially significant purpose other than the circumvention of copyright protection.[80] Alternatively, one can be liable by knowingly marketing such a device or service while acting alone or in concert with others.[81]

3. Additional Violations: § 1201(b)

The final anti-circumvention provision is contained in the "Additional Violations"[82] section.[83] This section has the same wording

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After reviewing all of the comments and the testimony of the witnesses who appeared at the hearings, the Register concludes that a case has been made for exemptions relating to two classes of works:

Compilations consisting of lists of web sites blocked by filtering software applications; and

Literary works, including computer programs and databases, protected by access control mechanisms that fail to permit access because of malfunction, damage or obsoleteness.

Id.

78. *See* Nimmer, *supra* note 8, at 684.

79. *See generally* 17 U.S.C. § 1201(a)(2). This provision states:

(2) No person shall manufacture, import, offer to the public, provide, or otherwise traffic in any technology, product, service, device, component, or part thereof, that—

(A) is primarily designed or produced for the purpose of circumventing a technological measure that effectively controls access to a work protected under this title;

(B) has only limited commercially significant purpose or use other than to circumvent a technological measure that effectively controls access to a work protected under this title [17 U.S.C.A. § 1 et seq.]; or

(C) is marketed by that person or another acting in concert with that person with that person's knowledge for use in circumventing a technological measure that effectively controls access to a work protected under this title.

(3) As used in this subsection—

(A) to "circumvent a technological measure" means to descramble a scrambled work, to decrypt an encrypted work, or otherwise to avoid, bypass, remove, deactivate, or impair a technological measure, without the authority of the copyright owner; and

(B) a technological measure "effectively controls access to a work" if the measure, in the ordinary course of its operation, requires the application of information, or a process or a treatment, with the authority of the copyright owner, to gain access to the work.

80. *Id.*

81. *See id.*

82. *See* Nimmer, *supra* note 8, at 684.

as the Ban on Trafficking, with one exception: it covers "portions" of a copyrighted work, as opposed to the whole work.[84]

4. Reverse Engineering: § 1201(f)

Of the various safe harbor exceptions provided under the DMCA, the "Reverse Engineering Safe Harbor"[85] provides the broadest

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83. *See generally* 17 U.S.C. § 1201(b). This provision states:

Additional violations.—

(1) No person shall manufacture, import, offer to the public, provide, or otherwise traffic in any technology, product, service, device, component, or part thereof, that—

is primarily designed or produced for the purpose of circumventing protection afforded by a technological measure that effectively protects a right of a copyright owner under this title [17 U.S.C.A. § 1 et seq.] in a work or a portion thereof; has only limited commercially significant purpose or use other than to circumvent protection afforded by a technological measure that effectively protects a right of a copyright owner under this title in a work or a portion thereof; or is marketed by that person or another acting in concert with that person with that person's knowledge for use in circumventing protection afforded by a technological measure that effectively protects a right of a copyright owner under this title in a work or a portion thereof.

(2) As used in this subsection—

to circumvent protection afforded by a technological measure means

avoiding, bypassing, removing, deactivating, or otherwise impairing a technological measure; and a technological measure effectively protects a right of a copyright owner under this title if the measure, in the ordinary course of its operation, prevents, restricts, or otherwise limits the exercise of a right of a copyright owner under this title.

84. *Compare* 17 U.S.C. § 1201(a)(2), *with* 17 U.S.C. § 1201(b).

85. *See generally* 17 U.S.C. § 1201(f). The section states:

(f) Reverse engineering.—

Notwithstanding the provisions of subsection (a)(1)(A), a person who has lawfully obtained the right to use a copy of a computer program may circumvent a technological measure that effectively controls access to a particular portion of that program for the sole purpose of identifying and analyzing those elements of the program that are necessary to achieve interoperability of an independently created computer program with other programs, and that have not previously been readily available to the person engaging in the circumvention, to the extent any such acts of identification and analysis do not constitute infringement under this title [17 U.S.C.A. § 1 et seq.].

Notwithstanding the provisions of subsections (a)(2) and (b), a person may develop and employ technological means to circumvent a technological measure, or to circumvent protection afforded by a technological measure, in order to enable the identification and analysis under paragraph (1), or for the purpose of enabling interoperability of an independently created computer program with other programs, if such means are necessary to achieve such interoperability, to the extent that doing so does not constitute infringement under this title [17 U.S.C.A. § 1 et seq.].

The information acquired through the acts permitted under paragraph (1), and the means permitted under paragraph (2), may be made available to others if the person

protections.[86] The Reverse Engineering Safe Harbor protects persons otherwise liable under the Basic Provision § 1201(a)(1)(A), who create a circumventing device for the purpose of facilitating interoperability.[87] Specifically, § 1201(f)(1) states:

> [A] person who has lawfully obtained the right to use a copy of a computer program may circumvent a technological measure that effectively controls access to a particular portion of that program for the sole purpose of identifying and analyzing those elements of the program that are necessary to achieve interoperability of an independently created computer program with other programs.[88]

Under § 1201(f)(3), only a person who acquires the information to create the device is free to make the information available to others.[89] This information can only be used for interoperability purposes.[90] Thus, those who author a device—a software program—designed to promote interoperability between programs utilizing protected copyrighted materials, can avail themselves of the Reverse Engineering Safe Harbor.

B. Two Interpretations of the Scope of § 1201(f)

There are two interpretations of the scope of the Reverse Engineering Safe Harbor protections. David Nimmer asserts that the person who creates a circumvention device for another's use is liable under § 1201(a)(2) for violating the Ban on Trafficking.[91] This liability exists regardless of the protections provided by § 1201(f)(3). Nimmer bases his argument on the fact that § 1201(f)(1) only provides a safe harbor for those who violate the Basic Provision of the DMCA.[92]

> referred to in paragraph (1) or (2), as the case may be, provides such information or means solely for the purpose of enabling interoperability of an independently created computer program with other programs, and to the extent that doing so does not constitute infringement under this title [17 U.S.C.A. § 1 et seq.] or violate applicable law other than this section.
>
> (4) For purposes of this subsection, the term "interoperability" means the ability of computer programs to exchange information, and of such programs mutually to use the information, which has been exchanged.

86. *Compare, e.g.*, 17 U.S.C § 1201(f), *with* 17 U.S.C. § 1201(e) (showing that the reverse engineering exception applies to all persons, whereas the law enforcement exception only applies to state or federal law enforcement authorities).

87. 17 U.S.C. § 1201(f)(1).

88. *Id.*

89. *See* 17 U.S.C. § 1201(f)(3).

90. *See id.*

91. *See* Nimmer, *supra* note 8, at 736.

92. *Id.*

Accordingly, under the Nimmer Analysis only the authors of a circumventing device can avail themselves of § 1202(f) protections.

Contrary to the Nimmer Analysis, the court in *Universal City Studios, Inc. v. Reimerdes* reasoned that "[s]ection 1201(f)(3) permits information acquired through reverse engineering to be made available to others only by the person who acquired the information."[93] Under the Reimerdes Analysis, the software developer who creates a circumvention device for another is not liable for violating the Ban on Trafficking. In particular under this analysis, § 1201(f)(3) protects a person who authors the device and makes it "available to others."[94] Regardless of which analysis is correct, both have negative implications for the Open Source Model.[95]

IV. RELEVANT CASE LAW

There are two cases that address liability under the DMCA. The first of these cases is *Universal City Studios, Inc. v. Reimerdes,*[96] and the second is *United States v. Elcom Ltd.*[97] Both of these decisions limit, or threaten to limit, the ability of software developers to tailor their software to meet the interoperability needs of consumers.

A. Universal City Studios, Inc. v. Reimerdes[98]

In *Reimerdes,* the court found that the defendants had violated the Ban on Trafficking[99] because they posted software on their web site designed to decrypt copyrighted materials contained on Digitally Versatile Disks (DVDs).[100] The type of protected materials at issue in

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93. Universal City Studios, Inc. v. Reimerdes, 111 F. Supp 2d. 294, 320, 55 U.S.P.Q.2d (BNA) 1873, 1888 (S.D.N.Y. 2000).

94. 17 U.S.C. § 1201(f)(3) (2000).

95. *See infra* Part V.A.

96. 111 F. Supp 2d. 294, 55 U.S.P.Q.2d (BNA) 1873 (finding that defendants had committed civil violations of the DMCA).

97. Indictment, United States v. Elcom Ltd., No. CR-01-20138 (N.D. Cal. Aug. 28, 2001) (defendants indicted for alleged criminal violations of the DMCA).

98. *Reimerdes*, 111 F. Supp 2d. 294, 55 U.S.P.Q.2d (BNA) 1873.

99. *See* Nimmer, *supra* note 8, at 684; 17 U.S.C. § 1201(a)(2)(A) - (B).

100. 111 F. Supp 2d. at 346, 55 U.S.P.Q.2d (BNA) at 1905-06; *see also* Declan McCullagh, *White House Sides with Studios*, Wired.com, *at* http://wired.com/news/politics/0,1283,41992,00.html (last visited Feb. 23, 2001) (reporting the Department of Justice's decision to intervene on behalf of the MPAA); Rob Pegoraro, *Hollywood to Home Viewer: We Own You*, WASH. POST, Aug. 25, 2000, at E01 (referring to *Reimerdes* as an example of the "fear and greed" driving the entertainment industry); David Streitfeld, *Judge Backs Hollywood in DVD Movie Case*, Washingtonpost.com, *at* http://www.washingtonpost.com/wp-dyn/articles/A47253-2000Aug17.html (Aug. 18, 2000)

Reimerdes was movies[101] encrypted with a program known as a Content Scrambling System (CSS).[102] The plaintiffs feared that once decrypted, DVD movies would be freely available on many Internet web sites.[103]

The centerpiece of the defendant's statutory defense was their attempt to avail themselves of the protections provided by the Reverse Engineering Safe Harbor.[104] The defendants argued that the program they posted on their web site, known as DeCSS,[105] was designed to further the development of a DVD player that could run on Linux.[106] The court rejected this argument on the grounds that there was little evidence to support this claim.[107] Moreover, the court pointed out that the defendants were not the authors of DeCSS within the meaning of Reverse Engineering Safe Harbor.[108] Accordingly, they were not entitled to the safe harbor protection.

(covering the parties' responses to the court's ruling). *See generally*, Chris Hawke, *Hollywood Hunts DVD Traders*, cbsnews.com, *at* http://cbsnews.com/now/story/0,1597,223303-412,00.shtml (last visited Aug. 9, 2000) (discussing the various legal steps taken by Motion Picture Association of America to stop the dissemination of the DeCSS program); Janet Shprintz and Paul Sweeting, *MPAA Sues Hackers over Decoder for Movie Files*, VARIETY, July 24, 2000, at 5 (covering the Motion Picture Association of America decision to sue over the posting of DeCSS).

101. *See Reimerdes*, 111 F. Supp 2d. at 303, 55 U.S.P.Q.2d (BNA) at 1873.

102. *See id.* at 308, 55 U.S.P.Q.2d (BNA) at 1879.

103. *See id.* at 342, 55 U.S.P.Q.2d (BNA) at 1904.

104. *See id.* at 319, 55 U.S.P.Q.2d (BNA) at 1888. Defendants also attempted to avail themselves of the protections afforded by the Encryption Research § 1201(g) and Security Testing § 1201(j) safe harbors. *Id.* at 320-21, 55 U.S.P.Q.2d (BNA) at 1889. Additionally, they argued that the positing of DeCSS fell under the fair use copyright exception, and that the DMCA violated their free speech rights. *See* id. at 321-39, 55 U.S.P.Q.2d (BNA) at 1889-1903.

105. *See Reimerdes*, 111 F. Supp 2d. at 311, 55 U.S.P.Q.2d (BNA) at 1881. *See generally DVD Encryption Cracked*, 2600.com, *at* http://www.2600.com/news/display.shtml?id=20 (Nov. 13, 1999) (co-defendant 2600 Enterprises Inc. providing a background of how the CSS encryption protection was circumvented).

106. This is an interoperability defense. *See Reimerdes*, 111 F. Supp 2d. at 311, 55 U.S.P.Q.2d (BNA) at 1881.

107. The court found that the program's primary use was to enable one to run DVDs on the Windows Operating System. *See id.* at 320, 55 U.S.P.Q.2d (BNA) at 1888.

108. *Id.*

B. United States v. Elcom Ltd.[109]

Elcom involved an alleged criminal violation of the Additional Violations provision by Russian software manufacturer Elcom Limited (Elcom), and in particular, one of its software designers, Dmitry Sklyarov.[110] Sklyarov, along with others, designed a product for Elcom called the Advance eBook Processor (AEBPR).[111] AEBPR allowed its user to circumvent various plug-in security features[112] added by the publishers of eBooks.[113] These features restricted the ability of the user to convert the eBook to another format.[114] For example, a publisher could restrict the ability of the user to convert the eBook text to speech. Such a conversion would be invaluable to someone who is blind.

AEBPR allowed a user to convert a restricted, protected eBook into an unrestricted Portable Document Format (PDF) file.[115] In turn, for example, a PDF file could be utilized by a text-to-speech conversion program. Despite the utility of such a device, Adobe Systems (Adobe), one of the manufacturers of eBook reading software,[116] objected to the sale of AEBRP.[117] In June 2001, Adobe contacted the FBI regarding the

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109. Indictment, United States v. Elcom Ltd., No. CR-01-20138 (N.D. Cal. Aug. 28, 2001), *available at* http://www.usdoj.gov/usao/can/press/assets/applets/2001_08_28_sklyarov_ind.pdf.

110. *See id.* Presumably, Elcom and Sklyarov were charged with violating this provision of the DMCA based upon the fact that AEBPR only defeated a particular feature of, or portion of, the eBook reader, namely the plug-in security feature. *See id. See also* Nimmer, *supra* note 8, at 736 (describing 17 U.S.C. § 1201(b)(1)(C) as the "Additional Violations" provision). *See generally* Jennifer Lee, *Cryptographer Held in E-Book Case Prefers Paper*, N.Y. TIMES, Aug. 11, 2001, at C1 (providing background information on Sklyarov); Jennifer Lee, *U.S. Arrests Russian Cryptographer as Copyright Violator*, N.Y. TIMES, July 18, 2001, at C8 (covering circumstances leading up to Sklyarov's arrest); David P. Hamilton, *U.S. Agents Arrest Russian Programmer Over Allegations of Copyright Violations*, WALL ST. J., July 18, 2001, at B4 (covering the arrest of Sklyarov).

111. *See* Affidavit in Support of Criminal Complaint, United States v. Elcom Ltd., No. CR-01-20138 (N.D. Cal. July 10, 2001), *available at* http://www.usaondca.com/press/assets/applets/2001_07_17_sklyar.pdf.

112. *Id. See also US v. Sklyarov: Frequently Asked Questions (and Answers) About the Dmitry Sklyarov Prosecution, supra* note 2.

113. *See* Affidavit in Support of Criminal Complaint at 2, *Elcom Ltd.* (No. CR-01-20138).

114. *See* Jennifer Lee, *U.S. Arrests Russian Cryptographer as Copyright Violator*, N.Y. TIMES, July 18, 2001, at C8.

115. *Id. See also US v. Sklyarov: Frequently Asked Questions (and Answers) About the Dmitry Sklyarov Prosecution, supra* note 2.

116. *See* Affidavit in Support of Criminal Complaint at 2, *Elcom Ltd.* (No. CR-01-20138).

117. *See id.*

threat AEBPR posed to encrypted, copyrighted eBooks.[118] Sklyarov was arrested by the FBI while attending a conference in the United States[119] and charged with a criminal violation of the DMCA.[120]

C. *Impact of* Reimerdes *and* Elcom *on Interoperability*

Both *Reimerdes* and *Elcom* place limitations on interoperability and, more specifically, on the services that an open source software developer can provide. The court in *Reimerdes* made the existence of this limitation clear.[121] The court found that § 1201(f)(3) "permits information acquired through reverse engineering to be made available to others only by the person who acquired the information. But these defendants did not do any reverse engineering. They simply took DeCSS off someone else's web site and posted it on their own."[122] *Elcom* reflects the fact that the limitations on interoperability will be applied, no matter how benign the potential use of the circumventing software.[123]

V. IMPLICATIONS FOR THE OPEN SOURCE MODEL

A. *Effect on the Open Source Model of Software Development*

The extent of the DMCA's impact on the Open Source Model will vary based on the analysis used to interpret the scope of the Reverse Engineering Safe Harbor. If Nimmer's Analysis[124] is used, then open source developers will be barred from providing services that increase the interoperability of programs utilizing encrypted materials. If the Reimerdes Analysis[125] is applied, then an open source developer will be

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118. *See id. But see* Elinor Mills Abreu, *Adobe Seeks Release of Russian Programmer*, REUTERS, *at* http://biz.yahoo.com/rf/010723/n2313080_2.html (July 23, 2001).

119. *See* Elinor Mills Abreu, *Russian Hacker Arrested After Las Vegas Convention*, REUTERS, *at* http://special.northernlight.com/publishing/russian_hacker.htm (July 18, 2001).

120. *See* Affidavit in Support of Criminal Complaint at 2, *Elcom Ltd.*, (No. CR-01-20138). Sklyarov subsequently entered into a diversion agreement whereby the government would drop the charges against him in exchange for his testimony against Elcom. *See* Pretrial Diversion Agreement at 6, *Elcom Ltd.*, No. CR 01-20138 RMW (N.D. Cal. Dec 13, 2001), *available at* http://www.usdoj.gov/usao/can/press/assets/applets/2001_12_13_sklyarov.pdf.

121. Universal City Studios, Inc v. Reimerdes, 111 F. Supp 2d. 294, 320, 55 U.S.P.Q.2d (BNA) 1873, 1888 (S.D.N.Y. 2000).

122. *Id.*

123. *See generally* Lessig, *supra* note 1 (citing that the AEBPR could be used to allow for text-to-speech conversion to help the blind).

124. *See supra* Part III.B.

125. *See id.*

able to provide services to write such programs, but his or her ability to engage in peer review will be restricted. Either result negatively affects the Open Source Model.

1. Nimmer's Analysis Limits Services

Providing services to create revenue is central to the Open Source Model.[126] Under Nimmer's Analysis of the Reverse Engineering Safe Harbor, the type of services that an open source developer can provide is curtailed.[127] Nimmer's Analysis asserts that there is a total ban on providing services to increase the interoperability of programs utilizing protected copyrighted materials.[128] In particular, one is free to write a program to circumvent copyright protections and facilitate interoperability, so long as no one else uses the program.[129] One is not free, however, to hire someone to help her exercise this legal right, by for example, writing a program for her.[130] Nimmer argues that this situation is created because, while the Reverse Engineering Safe Harbor provides protections for those who violate the Basic Provision of the DMCA,[131] no complementary provision exists for those who violate the Anti-Trafficking Ban.[132] Nimmer illustrates this point with the following example. Harry is a lay person, that is, a non-software developer, who needs a program to circumvent certain protections surrounding copyrighted materials.[133] Harry has every legal right to access these materials.[134] Sally is the developer who can help him exercise this right.[135] However, Harry cannot have Sally help him, because if she did, she would be violating the Ban on Trafficking.[136] Thus, even though Sally has the ability, she cannot provide Harry with a service that he needs.[137]

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126. *See supra* Part I.B.

127. *See supra* Part III.B

128. *See id.*

129. *See id.*

130. *See* Nimmer, *supra* note 8, at 736-37.

131. *See* 17 U.S.C. § 1201(a)(1)(A) (2000).

132. *See* Nimmer, *supra* note 8, at 736-37. Given the nearly identical wording of the Additional Violations provisions, this argument would also apply to that provision. *See* 17 U.S.C. § 1201(b).

133. *See* Nimmer, *supra* note 8, at 736-37.

134. *See id.*

135. *See id.*

136. *See id.*

137. *See generally id.* (Nimmer goes on to argue that the lack of a complementary provision negatively impacts those seeking to make fair use of copyrighted materials).

2. Reimerdes Analysis: Limits on Peer Review

Under the Open Source Model, the quality of the software is guaranteed through "massive, independent peer review."[138] The *Reimerdes* court's interpretation of § 1201(f)(3) limits peer review. Specifically, this interpretation means that only the person "who acquired the information"[139] has the right to make this information, that is, software, available to others.[140] Developers who merely review and re-post such information are not protected. Thus, under this analysis third party developers engaging in peer review, using the Internet for example, would be liable for violating the Ban on Trafficking or Additional Violations provisions.

The above limitation on peer review is reflected in the following example. Ed asks Jed, an open source developer, to write a program to convert a protected eBook file into a PDF file.[141] Ed wants to be able to use the PDF file to enable his blind daughter to listen to an eBook.[142] Jed buys a licensed copy of Adobe eBook Reader.[143] Jed writes what he believes to be a program that will convert the protected eBook file to a PDF file. Uncertain if he removed all of the bugs, he posts the program, named "ConvertIt," on an open source web site and asks that someone take a look at the program for bugs.[144] Ned, another open source

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138. *See* Leonard, *supra* note 22 (quoting Eric Raymond); *see supra* Part II.C.3.

139. Universal City Studios, Inc. v. Reimerdes, 111 F. Supp 2d. 294, 320, 55 U.S.P.Q.2d (BNA) 1873, 1888 (S.D.N.Y. 2000). *Cf.* 17 U.S.C. § 1201(f)(3) ("The information acquired through the acts permitted under paragraph (1), and the means permitted under paragraph (2), may be made available to others . . . .").

140. This information could be made available to others in the form of a software program.

141. This is factually similar to *Elcom Ltd.* *See* Affidavit in Support of Criminal Complaint at 2, *Elcom Ltd.*, (No. CR-01-20138).

142. The interoperability in this example is between the eBook reader and the text-to-speech program. *Cf.* Lessig, *supra* note 1 (citing this rather benign purpose as one of the problems with attempting to prosecute Sklyarov under the DMCA).

143. *See generally* 17 U.S.C. § 1201(f)(1) (2000) (referring to a "lawfully obtained" right to use).

144. Web sites containing open source materials seeking peer review are common on the Internet. *See generally* Internet.com, *at* http://www.internet.com/sections/linux.html (last visited Sept. 3, 2001) (providing various channels for learning about open source software); HandiLinks, *at* http://handilinks.com/Directory/Computers/Bulletin_Board_Systems/ (last visited Sept. 3, 2001) (bulletin board of bulletin boards regarding various open source subjects); developerWorks, *at* http://www-124.ibm.com/developerworks/oss/ (last visited Sept. 3, 2001) (an IBM web site hosting a variety of open source projects); Open Source Directory, *at* <http://www.opensourcedirectory.org/ (last visited Sept. 3, 2001) (providing a wide selection of open source programs); The Perl Archive, *at* http://www.perlarchive.com/guide/BBS/next5.shtml (last visited Sept. 3, 2001) (posting programs written in the Perl scripting language); PHP Web Site, *at*

developer, downloads ConvertIt and finding nothing wrong with it, re-posts it onto the web site that Jed initially posted the program. Now there are two copies of ConvertIt on the web site: one posted by Jed and another posted by Ned. Along comes Fred, a third open source developer. Fred sees that he can choose to run and debug either Jed's or Ned's posting of ConvertIt. He chooses Ned's version, reviews it, and re-posts it without modification. Fred is now liable for violating the Ban on Trafficking and the Additional Violations provisions. The Reverse Engineering Safe Harbor cannot help him.[145]

B. The Upshot

Under both Nimmer's analysis and the court's analysis in *Reimerdes*, the Open Source Model is limited in its ability to provide services. Nimmer's analysis of the Reverse Engineering Safe Harbor prohibits open source developers from providing a whole category of services to consumers, that is, services that would increase interoperability between programs utilizing protected copyrighted materials. The court's reasoning in *Reimerdes*, on the other hand, would limit the quality of the services provided under the Open Source Model by prohibiting certain types of peer review, for example peer review by third party developers.

Whatever the limitations imposed by the DMCA, the DMCA is a law and a product of congressional intent. Until recently,[146] supporters of the Open Source Model have failed to lobby Congress regarding the affect of the DMCA on the Open Source Model.

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http://phpwebsite.appstate.edu/article.php?sid=49 (last visited Sept. 3, 2001) (founded by Appalachian State University, facilitates the management of community based, open source web sites). *Cf. Raymond, supra* note 22, at 21 (describing how the internet allowed Linux to develop and thrive through the linking of thousands of developers all over the world).

145. Under the court's analysis in *Reimerdes*, Fred could have only availed himself of the protections of § 1201(f)(3) when he received the circumventing software from the person who "acquired the information" to develop the circumventing software, that is, Jed. 111 F. Supp 2d. at 320, 55 U.S.P.Q.2d (BNA) at 1888. Interestingly, Ned would also be liable for a § 1201(a)(2) violation because he also re-posted the program.

146. *See generally* Deborah Durham-Vichr, *Protests Draws Attention to DMCA*, LinuxWorld.com, *at* http://www.linuxworld.com/linuxworld/lw-2000-03/lw-03-dmca.html (last visited Aug. 20, 2001) (describing the protest activities of certain open source supporters against the DMCA); Robert Lemos, *Red Hat Funds Copyright Fight*, zdnet.com, *at* http://www.zdnet.com/filters/printerfriendly/0,6061,2573050-2,00.html (May 19, 2000) (covering the creation of the Red Hat Center for Open Source and its donation of money to support education regarding the legal use of reverse-engineering).

VI. A SOLUTION

The limitations imposed by the DMCA are a product of the failure of the supporters of the Open Source Model to take an active role in the political process. Clearly, the Open Source Model is a viable model of software development that both its competitors and investors take seriously.[147] Despite this, supporters of the Open Source Model have failed to lobby Congress to protect their interests. Conversely, the importance of lobbying Congress has not been lost on those who generally oppose the Open Source Model[148] and those who oppose circumvention devices in particular.[149]

A. Congressional Intent and the DMCA: Two Approaches to Protecting Copyrights

In conducting its statutorily-mandated review of the DMCA,[150] the Librarian of Congress noted that "[t]he proponents of an exemption for reverse engineering have expressed their dissatisfaction with the limited circumstances under which section 1201(f) permits reverse engineering, but the case they have made is for the legislature rather than for the Librarian."[151] Congress has the ultimate authority to change the limitations imposed by the DMCA on the Open Source Model. The original intent in passing the DMCA was to create an environment where content producers would have the incentive to create new products.[152] To this end, Congress sought to use the law to prevent people from circumventing copyright protections. It is possible for Congress to amend the Reverse Engineering Safe Harbor in such a way that would allow content producers to flourish, but at the same time would not impose limitations on the Open Source Model referenced above.

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147. *See supra* Part II.E.

148. *See* John M. Broder & Joel Brinkley, *How Microsoft Sought Friends in Washington*, N.Y. TIMES, Nov. 7, 1999, at 1.

149. *See generally Digitial Millennum Copyright Act: Hearings on H.R. 2281 Before the Subcommittee on Telecommunications, Trade and Consumer Protection Committee on Commerce, U.S. House of Representatives*, 104th Cong. (1998) (statements of Steven J. Metalitz representing the MPAA in support of the DMCA and statements of Robert Holleyman of the Business Software Alliance in support of the DMCA).

150. *See supra* Part III.A.1.

151. *See* 65 Fed. Reg. 64562-64563.

152. *See supra* Part III.

1. Present Approach: Supporting Bad Code

The present approach to preventing people from defeating copyright protection centers on the use of the law to impose civil and criminal sanctions. This approach assumes that the best way to allow content producers to flourish is to assist them in investing in the development of content, rather than in protections for this content.[153] This approach is problematic in two respects. First, it fails to acknowledge the ease in which programs can be written to defeat protections such as encryption.[154] Second, it does not address the economic incentives to engage in such activities.[155] This approach has resulted in the support of bad code, that is, code that fails to meet the encryption needs of the content producers.[156]

2. The Open Source Approach: Creation of Better Code

An open source approach to protecting copyrighted materials would seek to use increasingly more sophisticated encryption protections to meet the increasing sophistication of those seeking to defeat such protections. One of the chief criticisms of the court's decision in

153. *See generally* Universal City Studios, Inc. v. Reimerdes, 111 F. Supp 2d. 294, 315, 55 U.S.P.Q.2d (BNA) 1873, 1884-85 (citing the costs of having to implement a new DVD protection system).

154. *See* Bruce Schneier, *The Crypto Bomb is Ticking*, BYTE, May 1998, at 97 (arguing that, based upon Moore's Law, which says that processor speed doubles every two years, decryption attacks will be ten times less expensive and ten times faster every five years). *See generally*, Ann Harrison, *Flawed Copyright Protection Puts New Spin on DVD; Possible DVD Audiohacking a Concern*, COMPUTERWORLD, Dec. 13, 1999, at 60 (citing the weakness of the 40-bit encryption protection); Sharon Machlis, *RSA Stunt Shows up Encryption Weakness*, COMPUTERWORLD, Feb. 3, 1997, at 10 (citing the fact that it took graduate students as U.C. Berkeley 3.5 hours to crack a 40-bit encryption protection); Peter Coffee, *No Crypto is Too Tough to Crack*, PCWEEK, Sept. 29, 1997, at 16 (citing the ease with which the 40-bit encryption protection is defeated).

155. *See generally* 144 CONG. REC. S4884 (1998) (Statements of Sen. Hatch: "American companies are losing $18 to $20 billion annually due to the international piracy of copyrighted works."); Thomas Claburn, *Pursuing Pirates—The Business Software Alliance is Looking for a Few Good Informers*, ZIFF DAVIS SMART BUS. FOR THE NEW ECON., Sept. 1, 2001, at 34 ("Global software piracy losses in 2000 totaled a staggering $11.8 billion . . . ."); *Shiver Me Timbers; Software-Piracy Rates*, THE ECONOMIST, June 2, 2001, at 2 (citing the same Business Software Alliance figures); Michael Dorgan, *Chinese Piracy Expected to Spread Worldwide,* KNIGHT-RIDDER/TRIBUNE NEWS SERVICE, Jan. 11, 2001, at K6962 ("The Business Software Alliance concluded in 1994 that 97 percent of software then in use in China was pirated."). The creator of DeCSS lived in Norway, while the creator of AEBPR lived in Russia. *Id.* Given the economic incentives at stake, tomorrow's violators may well live in Laos and Kenya.

156. *See supra* Part II.C.1.

Reimerdes is that it protects an antiquated 40-bit encryption algorithm.[157] Some commentators have even gone so far as to say that the "DVD encryption break is a good thing."[158] Rather than being cavalier, such statements highlight the approach to encryption taken by the Open Source Model. Namely, encryption protections should be rigorously tested, and once shortcomings are found, they should be fixed.[159] Code that fails to adequately protect should not be supported; rather, it should be rewritten.[160] A collateral benefit of the efforts by open source developers to increase the interoperability of programs utilizing encrypted data is the exposure of shortcomings in encryption protections. Content producers are free to use this benefit to upgrade their encryption protections against those seeking to pirate their products.[161]

3. A Change in the Reverse Engineering Safe Harbor

The Reverse Engineering Safe Harbor needs to be changed to provide protection for open source developers.[162] Amending § 1201(f)(1) to cover those who would otherwise be liable under the Ban on Trafficking and Additional Violations provisions can provide this protection. This could be readily accomplished by modifying the phrase "[n]otwithstanding the provisions of §§ (a)(1)(A)," contained within § 1201(f)(1), to read "notwithstanding the provisions of subsection (a)(1)(A), (a)(2) and (b)." Nimmer alludes to the necessity of this sort of change.[163] Additionally, one would also have to add language to § 1201(f)(3) to allow for peer review by third party developers. Such changes would address the limitations arising from applying either

157. *See generally* Wyn Hilty, *Making Copies: The Menace Threatening the Global Entertainment Industry? Linux Users!?*, ORANGE COUNTY WEEKLY, Jan. 28, 2000 ("CSS used only a 40-bit encryption key (anything less than 56 bits is generally considered inadequate for security)."), *available at* http://www.ocweekly.com/ink/00/21/machine-hilty.shtml.

158. Bruce Schneier, *DVD Encryption Break is a Good Thing*, zdnet.com, *at* http://www.zdnet.com/filters/printerfriendly/o,6061,2395497-2,00.html (Nov. 16, 1999).

159. *Cf.* P.J. Connolly, *Security Adviser: Crypto Law Misguided—Adobe eBooks-Cracking Case Highlights U.S. Copyright Law That Stifles Free Speech and Innovation*, INFOWORLD, Aug. 6, 2001, at 45 (arguing that even academics are prohibited under the DMCA from engaging in encryption research).

160. *See* RAYMOND, *supra* note 22, at 118-19.

161. This is especially true given the open nature of the source code used by those in the open source movement. In particular, content owners would be able to see exactly how their protections were circumvented.

162. *See supra* Part V.A.

163. *See* Nimmer, *supra* note 8, at 738-39.

Nimmer's analysis or the court's reasoning in *Reimerdes* of the Reverse Engineering Safe Harbor. In the former, the open source developer could provide interoperability services to the layperson, for example traffic in such services, while in the latter, he or she could provide peer review to support such services.

B. The Importance of Participation in the Political Process

In order to effectuate this change in the Reverse Engineering Safe Harbor, supporters of the Open Source Model need to lobby Congress. Until recently, open source supporters have failed to get their message across to those in Congress.[164] There are a couple of reasons for this failure. First, in the past, software developers and their companies have generally been slow to see the need to take part in the political process.[165] Second, the proponents of the Open Source Model have failed to see the importance of political lobbying to generate support for their model.[166] Meanwhile, opponents of the Open Source Model have actively lobbied Congress.

1. The Success of Their Opponent's Message

Microsoft has learned from early mistakes and now spends millions of dollars each year actively lobbying Congress.[167] In a similar fashion, those content producers who make up the Motion Picture Association of America (MPAA) have spent millions of dollars lobbying Congress.[168]

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164. *See* Durham-Vichr, *supra* note 146.

165. *See, e.g.,* John Miano, *Programmers are Programmed Against Unions*, COMPUTERWORLD, Nov. 20, 2000, at 33 ("Programmers tend to be libertarian in their views and treat the two major political parties with suspicion, if not contempt."); John Simons & John Harwood, *For the Tech Industry, Market in Washington Is Toughest to Crack*, WALL ST. J., Mar. 4, 1998, at A1 (quoting Cisco CEO John Chambers as stating: "Most of us abhor politics."); Jeffrey H. Birnbaum, *Microsoft's Capital Offense*, FORTUNE, Feb. 2, 1998, at 84 (citing the "indifference" of Microsoft to the political process); *Moody*, *supra* note 7, at 153 (quoting Eric Raymond as a self-described "market anarchist" who "would like to abolish government altogether").

166. *See, e.g., supra* Part II.E (noting the failure of open source leaders such as Raymond to list politicians as one of the groups that they need to convince of the benefits of open source).

167. *See generally Computer Software: Top Contributors*, opensecrets.org, *at* http://www.opensecrets.org/industryies/contrib.asp?Ind=C5120&Cycle=2000 (last visited Aug. 20, 2001) (citing Federal Election Commission figures showing that for the 1999-2000 election period Microsoft donated $4,360,826 to various election campaigns, more than four times the amount of donations made by the company in the number two position).

168. The MPAA is a trade organization representing the interests of the major movie studios. *See generally Motion Picture Association of America*, opensecrets.org, *at* http://www.opensecrets.org/lobbyist/98profiles/16401.htm (last visited Aug. 20, 2001) (citing

The lobbying efforts of these companies and their various trade groups have paid off in the form of laws such as the DMCA.[169]

2. The Need to Find Allies

Regardless of the open source proponents' past failures to lobby Congress, there are those in Congress who see the inherent problems with the present DMCA regime.[170] For example, Representative Rick Boucher of Virginia has argued that the DMCA limits the fair use copyright exception to such a point that we may see the day when all copyrighted materials are accessed on a "pay-per-use basis."[171] Clearly, the failure of the DMCA to provide safe harbors for those otherwise engaged in legal software development only adds to the arguments of people like Representative Boucher and others calling for a change.

VII. CONCLUSION

As presently written, the DMCA limits a software developer's ability to provide services by writing code that increases the interoperability between programs utilizing protected copyrighted materials. Alternatively, it limits the ability of software developers to obtain peer review for such services. The Open Source Model of software development is negatively impacted by these limitations due to its use of

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Federal Election Commission figures reporting that the MPAA spent $980,000 on lobbying during 1998); *Sony Corp. of America*, opensecrets.org, *at* http://www.opensecrets.org/lobbyist/98profiles/22227.htm (last visited Aug. 20, 2001) (citing Federal Election Commission figures reporting that Sony Pictures Entertainment spent $260,000 on lobbying during 1998); *Joseph E. Seagram & Sons*, opensecrets.org, *at* http://www.opensecrets.org/lobbyist/98profiles/12376.htm (last visited Aug. 20, 2001) (citing Federal Election Commission figures reporting that Joseph E. Seagram & Sons, the parent of Universal City Studio's Inc., spent $380,000 on lobbying during 1998).

169. *See generally* Jennifer Shecter, *No lights, No Camera, Lots of Action: Behind the Scenes of Hollywood's Washington Agenda*, opensecrets.org, *at* http://www.opensecrets.org/alerts/v4/alrtvn35.asp (Oct. 11, 1998) (discussing the legislative agenda of various motion picture companies); Jennifer Shecter, *One Microsoft Way*, opensecrets.org, *at* http://www.opensecrets.org/alerts/v4/alrtv4n18.asp (May 11, 1998) (discussing Microsoft's 1998 donations and legislative agenda); Carol Sliwa & Kim S. Nash, *Playing the Game*, COMPUTERWORLD, Nov. 17, 1997, at 109 (discussing the Research and Development tax credit and Foreign Sales tax credits received by Microsoft).

170. *See Address by Rep. Rick Boucher re: Proposal for Changes to the Fair Use Doctrine in the Context of Digital and Internet Media*, Tech. L. J., *available at* http://www.techlawjournal.com/intelpro/20010306boucher.asp (Mar. 6, 2001).

171. *See id. See generally* Norman Oder, *Rep. Boucher Calls for New Reforms in Copyright Law*, LIBR. J., Apr. 1, 2001, at 14 (citing Rep. Boucher's argument that the DMCA needs to be changed to accommodate fair use needs); *Anti-Circumvention Rule Making Completed*, INFO. OUTLOOK, Jan. 2000, at 48 (citing Rep. Boucher's call for the 107th Congress to take up the issue of amending the DMCA to accommodate fair use).

service as a primary revenue generator. Cases such as *Reimerdes*[172] and *Elcom*[173] illustrate the fact that the DMCA limits the types of services that can be provided, regardless of how benign these services may be. These limits arise from the failure of the Reverse Engineering Safe Harbor to protect such services or the peer review of them. Supporters of the Open Source Model need to take an active role in the political process and find allies in Congress willing to make changes to the Reverse Engineering Safe Harbor that accommodate the Open Source Model.

172. Universal City Studios, Inc. v. Reimerdes, 111 F. Supp 2d. 294, 55 U.S.P.Q.2d (BNA) 1873 (S.D.N.Y. 2000).

173. Indictment, United States v. Elcom Ltd., No. CR-01-20138 (N.D. Cal. Aug. 28, 2001).